The Glass Industry

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Vol. 5 FEBRUARY, 1924 No. 2

Twenty-Sixth Annual Meeting of the American Ceramic Society

By A. E. Williams

The twenty-sixth annual meeting of the American Ceramic Society started off at the Hotel Traymore, Atlantic City, N. J., on February 4, with unusual enthusiasm, a large number of visiting members being registered.

A generous program was given, including eight addresses, 93 papers, and 18 subjects for discussion, and all sections were well attended. Details of the program of the Glass Division are given in this article together with brief abstracts of the papers presented.

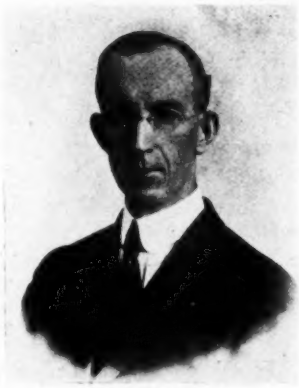
The Ceramic Society is a live and growing organization enrolling 2,250 members, 290 of which are corporation memberships. This is an increase of 425 members since last year and 765 more than in the year 1922. This wonderful growth was very evident in the interest and activity shown in society affairs at the convention.

The Glass Division membership is also showing consistent growth and members are showing increased interest in its activities. There are now 268 members in this division of the society, 42 of which are corporation memberships. This shows an increase of 12 per cent during the past year.

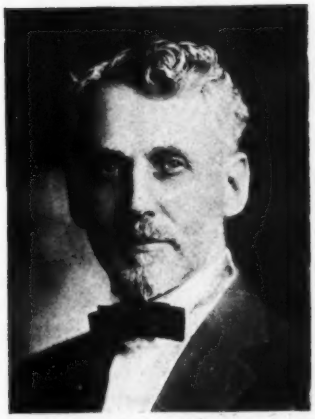
Officers of the American Ceramic Society, 1924

R. D. LANDRUM
President

R. M. HOWE
Vice-President



H. B. HENDERSON
Treasurer



ROSS C. PURDY
Secretary

Men in the glass industry who are interested in promoting scientific investigation and control of their industrial problems should interest themselves in the Ceramic Society, as their conventions are the only place where manufacturers and technical men get together and discuss matters of mutual interest.

The opening day of the convention was given over to a general session of the society during which several very interesting addresses were heard. The central theme of all addresses for the day was research. This vital subject was discussed from every angle during the meeting.

President A. F. Greaves-Walker opened the meeting with an address in which he noted the increased interest in ceramic education, stating that four universities had started such departments during the past year, and noting the increased demand from the factories for technical men with ceramic training.

Dr. E. H. Howe, editor of *Industrial and Engineering Chemistry,* presented an address on "Research and Trade Association Activity." Dr. Howe told of the many trade associations and industries supporting research laboratories or programs and gave in detail the benefits derived from many of these enterprises. He showed clearly that research done by an association for the benefit of all in the industry raised the standards of that industry very considerably and was a good investment. Funds for carrying on the work usually being provided on a basis of value of the product made by the individual members. He suggested that the Ceramic Society as a group might finance such a laboratory to work on problems of general interest to all.

Dr. C. L. Norton of the Massachusetts Institute of Technology, described in a very interesting manner the plan of industrial co-operation in operation at that institution.

Briefly the plan is an arrangement such that industries by furnishing necessary funds could have a problem investigated in the institution by members of the faculty or under their direction, many of the members of the faculty thus giving a portion of their time to teaching and a portion to research. Such a plan has the advantage of taking certain problems out of the research laboratories at the plants so they will have more uninterrupted attention and the added advantage of the advice of a large group of experts on various subjects.

A paper prepared by Dr. Jeffry of the Champion Porcelain Company, entitled "How to Co-ordinate the Ceramic Laboratory with Plant Production," was presented for him by H. F. Royal. The talk was generously illustrated with pictures of the laboratory and many very desirable laboratory features were shown.

Mr. Herman, of the A. D. Little Company, discussed the manner in which technical men can be of help to the industry. But also emphasized the great necessity of the technical man's ideas being stated in industrial terms and magnitude to prevent perfectly good ideas from being doomed to failure before a trial.

Wm. R. Bassett, industrial engineer, gave very interesting detailed illustrations of what savings could be accomplished by carefully studying small details of operation and not overlooking the savings of very small quantities of material where small parts are made. Careful analysis of every phase of a process often shows the possibility of considerable economy.

Ralph B. Wilson, from Babson's Statistical Organization, showed many interesting charts of industrial conditions over a considerable period of time and expressed the opinion that conditions would remain about as they are during the coming year.

Election of Officers

The following officers of the society were elected for the ensuing year:

PRESIDENT: Robert D. Landrum.

VICE-PRESIDENT: Raymond M. Howe.

TREASURER: H. B. Henderson.

TRUSTEES: F. H. Rhead, R. R. Danielson, J. C. Hostetter, C. Forrest Tefft, J. S. McDowell, R. L. Clare, C. C. Treischel.

FOR THE GLASS DIVISION

CHAIRMAN: G. E. Barton, Whitall-Tatum Glass Company.

VICE-CHAIRMAN: R. R. Shively, B. F. Drakenfeld & Company.

SECRETARY: A. N. Finn, U. S. Bureau of Standards.

COUNCILLORS: Alexander Silverman, University of Pittsburgh; F. C. Flint, Hazel-Atlas Glass Company; A. E. Williams, Thatcher Manufacturing Company.

Officers of the American Ceramic Society

J. C. HOSTETTER
Trustee, Glass Div.

C. FORREST TEFFT
Trustee, Heavy Clay Div.

R. R. DANIELSON
Trustee, Enamel Div.

J. SPOTTS McDOWELL
Trustee, Refractories Div.

The officers of the society were installed at the annual banquet on Tuesday evening, which was a brilliant and pleasing affair. Four hundred attended the banquet and were greeted by Roy Minton as toastmaster on behalf of the New Jersey section of the society. The feature entertainment of the evening was furnished by the magician "Dunniger," who specializes in thought reading magic.

Meetings of the Glass Division

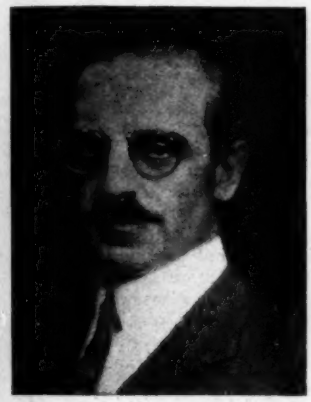
The Glass Division had a varied and interesting program. The division held four sessions Tuesday and Wednesday, during which time the following program was given and discussed. The subject of refractories and furnace construction seemed to be of most interest to those present.

Program of the Glass Division

A. R. Payne, Chairman A. E. Williams, Secretary

1. Immiscibility in High Silica Melts.
By J. W. Greig, Geophysical Laboratory of Washington
2. Thermal Expansion of Fused Quartz.
By G. E. Merritt, U. S. Bureau of Standards
3. Conductivity of Sodium Chloride in Soda Lime Glass.
By Willard J. Sutton and Alexander Silverman, University of Pittsburgh
4. Devitrification in a Lime-Flint Glass Tank.
By A. R. Payne, Hazel Atlas Glass Co.

Officers of the American Ceramic Society



F. H. RHEAD
Trustee, Art Div.

J. W. CRUIKSHANK
Chairman Pittsburgh Section

ROBERT L. CLARE
Trustee, Terra Cotta Div.

C. C. TREISCHEL
Trustee, White Wares Div.

5. Inherent Errors in Commercial Optical Pyrometers.
By G. V. McCauley, Corning Glass Works
6. Development of Apparatus for Determining Viscosity of Glass.
By L. A. Palmer, A. N. Finn and A. E. Williams, U. S. Bureau of Standards
7. Longer Life for Our Tanks.
By C. H. Modes, Illinois Glass Company
8. The Behavior of Refractories in Glass Melting Furnaces.
By Dr. Herbert Insley, U. S. Bureau of Standards
9. Comparative Service Tests on Gross Almerode and Domestic Clays.
By W. S. Williams
10. Effects Obtained by Heat Treating Glass.
By A. Q. Tool, U. S. Bureau of Standards
11. Tests on the Corrosion of Checker Brick in Alkaline Flue Dust.
By M. C. Booze and F. C. Flint
12. Discussion: What Is the Effect of Selenium Decolorizer on Tank Blocks?
Led by H. L. Dixon, H. L. Dixon & Co.
13. A Graphical Solution of Some Combustion Problems.
By G. M. Petz, Corning Glass Works
14. Some Combustion Problems in Glass Making.
By C. D. Smith, Simplex Engineering Company
15. A Heat Balance of a Glass Tank Furnace and Analysis of Thermal Losses.
By Robert D. Pike and Geo. H. West
(Not presented, but will be printed later.)
16. Insulation of Glass Tanks.
By W. K. Brownlee, Buckeye Clay Pot Company
17. Discussion: What Is the Effect of Tank Conditions on Selenium Color?
Led by R. R. Shively, B. F. Drakenfeld Company
18. Misbranding Raw Materials and Ceramic Chemicals for Glass Manufacture.
By Alexander Silverman, University of Pittsburgh
19. The Development of Transparent Colored Glass in America for Goggle Purposes.
By Edwin L. Hettinger
20. Early Development of Optical Glass.
By H. H. Blau, Macbeth-Evans Glass Co.
21. Practical Experience for the Glass House Chemist.
By R. R. Shively
22. How to Get Rid of Scum on a Tank Melting Flint Bottle Glass.
By J. Wm. Gayner

Papers and Discussions

Immiscibility in High Silica Melts

J. W. GREIG

This paper gave the results of determining the homogeneity of silicate melts high in silica and containing alumina, lime, magnesium and sodium. The general conclusion, illustrated by lantern slides was that most combinations very high in silica did not become homogeneous.

Thermal Expansion of Fused Quartz

G. E. MERRITT

Mr. Merritt showed expansion curves of fused quartz, pyrex glass and ordinary glass over a wide range of temperatures. The very low expansion of fused quartz was made very evident by comparison. The peculiar characteristics of the expansion curves at low temperatures and at temperatures approaching the softening points of the glasses were also pointed out, the curves showing a reversal in direction, i. e., contraction rather than expansion. This work was done by an interferometer method, a very accurate way of making these determinations; a description of this apparatus will be given in detail in the *Journal of the American Ceramic Society* at a later date.

Conductivity of Sodium Chloride in Soda Lime Glasses

W. J. SUTTON AND ALEXANDER SILVERMAN

Dr. Silverman presented briefly the results of an investigation of the above subject. Much time and care has been given to this work and the results have much value as a contribution to fundamental knowledge of glasses.

Some of the conclusions from the work are:

1. A search of the literature indicates that this work is the first study of the electrical conductivity of salts dissolved in molten silicates. The conductivity of mixtures of sodium chloride and molten glass is similar in nature to other molten salt mixtures.

2. The conductivity of a soda lime glass increases in proportion to the amount of sodium chloride added. The increase is sufficient to show ionization although the conductivity of the salt is not nearly as great as it is in molten sodium chloride at a given temperature.

3. The maximum value of sodium chloride found in plate glass by Gelstharp was 1.48%. It has been checked in this work by a value of 1.41%, though in the glasses studied by Gelstharp the salt was added to the raw batch, while in this work it was added to the finished glass.

4. Since sodium ions are present in opal glasses without destroying opalescence, and since the addition of negatively charged chloride or sulphate ions will remove this effect, the colloid present must be positive in its nature if the opalescence is due to colloidal material as generally assumed. This seems to resemble the coagulation of colloidal particles in aqueous solutions by the addition of ions of opposite charge. If the colloid in molten glass is Al_2O_3 then it is probably positive as colloidal $Al_2O_3 \times H_2O$ is positive in aqueous media. Since many positive sodium ions are present in opal glass its coagulation by added salt must be due to negative chloride ions.

Devitrification in a Lime Flint Glass Tank

A. R. PAYNE

Mr. Payne related an experience with stony glass due to a devitrified product. This product was identified microscopically as cristobalite and the trouble was finally traced to a water-cooled throat in which the refractories had given out. The temperature conditions of the glass due to the cooling on the edges were such as to promote crystalization and the only remedy was to shut down and replace the throat. Crystalization occurred even though the glass composition was one not necessarily subject to easy crystalization.

Inherent Errors in Commercial Optical Pyrometers

G. V. MCCAULEY

This paper pointed out that optical pyrometers were subject to sudden changes in readings at times, due to the ammeter chiefly.

Development of Apparatus for Determining Viscosity

L. A. PALMER, A. N. FINN AND A. E. WILLIAMS

Work was done on a variety of glasses such that their relative viscosity temperature relations were shown. The curves showed that magnesium replacing lime gave similar curves in direction but at a slightly higher temperature. Increase in the alkali earths in place of alkalies also changed the temperature range rather than the slope of the curve at the lower temperatures. Alumina increased the viscosity considerably at melting temperatures but the slope of the curve at molding temperatures was one of a more gradual change. This work is being continued.

Longer Life for Our Tanks

C. H. MODES

Mr. Modes emphasized the many diverse opinions regarding tank construction and refractories and urged some kind of co-operation or laying on the table of the records and designs of tanks by various manufacturers, which should result in arriving at some very beneficial conclusions to all concerned.

His suggestion is admirable and future progress will depend largely on that kind of co-operation.

The Behavior of Refractories in Glass Melting Furnaces

H. E. INSLEY

Dr. Insley presented the results of microscopic examinations of used glasshouse refractories. The results he obtained gave evidence as to the transformations taking place during use, and the relative solubilities of constituents of refractories in the glass. On this evidence it is found that high alumina refractories would resist the solvent action of the glass and the fluxing action of the soda in the furnace atmosphere better than fire-clay refractories. It is also found that investigations are needed to find a new refractory mortar for use between silica and clay refractories in glass tanks.

Effects Obtained by Heat Treating Glass

A. Q. TOOL

Dr. Tool presented an illustrated talk on his extensive work on the behavior of glass upon heating and cooling under various conditions. Endothermic and exothermic effects are obtained, their degree depending upon the previous heat treatment of the glass before determination. Exothermic effects are obtained on chilled glass, while they do not show on annealed glass. These effects occur at about the same temperatures that are required for annealing and where changes appear in the expansion of the glass.

It has been suggested that the reaction may possibly be due to molecular re-arrangement in the glasses or to incipient crystalization phenomena.

Tests On the Corrosion of Checker Brick in Alkaline Flue Dust

M. E. BOOZE AND F. C. FLINT

Mr. Flint presented a brief description of a series of tests comparing the service obtained from checker brick of various types in checkers running at 1,800° F. and 2,200° F.

In general the results showed that silica brick were of little value as compared to clay brick and that high alumina brick were better than low alumina brick. From the standpoint of scaling, however, the brick highest in alumina formed rather a heavy scale in the hot checker, although it did not disintegrate at all like silica or clay brick low in alumina.

What Is the Effect of Selenium Decolorizer On Tank Blocks

H. L. DIXON

Considerable discussion of the above subject resulted from Mr. Dixon's interesting remarks. The subject was mentioned because of the apparently considerable shortening of life of tanks in the last few years beginning at about the time of the use of selenium as a decolorizer.

The possibility that selenium might cause a shorter life than manganese glass because of the fact that hot selenium glass is clear to the eye and possibly transmits more heat to the bottom and walls of the tank than manganese glass was suggested. This suggestion was criticised, however, on the basis that heat rays are not necessarily transmitted at the same relative rate as light rays and such a comparison cannot be safely made.

It seemed to be the view of others that tank life had shortened merely because conditions of operation are more severe, and greater tonnages are drawn from the tanks.

A Graphical Solution of Some Combustion Problems

G. M. PETZ

This paper illustrated methods of calculation to be used with flue gas analyses and demonstrated the use of a chart designed by the author from which percentages of the constituent of the flue gas can be obtained without calculation.

Some Combustion Problems in Glass Making

C. D. SMITH

Mr. Smith related a number of his experiences in solving the troubles found in gas producer plants. He spoke of an interesting case where gas analyses were good yet the plant was not operating efficiently and illustrated how such a condition might occur and how it could be corrected.

Insulation of Glass Tanks

W. K. BROWNLEE

Mr. Brownlee showed that an outstanding feature of the effects of erosion of glass tanks, are the uneven vertical corrugations down the walls of the furnace and it was this condition that raised the question of insulation, as a means of preventing or reducing to some extent the convection currents that are moving downwards over the inner surface of the clay walls, drawing down with them the most active fluxes from the hot surface.

The walls of a pot suffer less from erosion than the walls of a tank, and it is possible that this is so, because the direction of the currents in a pot is directly opposite to what it is in a tank. In a pot, convection currents are going up the walls from a cooler temperature zone and in a tank they are going down the walls from the hottest temperature zone.

A tank was built to avoid this cold zone by insulating the tank in such a way that the upper part of the wall was uninsulated and insulation put on six inches from the top, increasing in thickness as the bottom was approached. The bottom was also insulated. This tank was run for a period of thirty days at 2500° to 2600° as a continuous tank. After this period the tank was let out and examined and no evidence of vertical lines of erosion or loss of metal through joints was observed.

The suggestions in this paper are worthy of much considera-

tion and there might easily be some considerable advantage obtained when the correct proportions of insulating material are determined.

What Is the Effect of Tank Conditions On Color

R. R. SHIVELY

Dr. Shively made a number of remarks regarding the use of selenium. He said that the hotter the tank the less selenium is required and believed a neutral condition of the furnace gases was most desired. He also remarked that it was possible to use small amounts of nitrates with selenium, contrary to the general opinion.

Misbranding of Ceramic Chemicals

ALEXANDER SILVERMAN

Dr. Silverman named a few instances where mixtures of minerals producing a final analysis similar to other more expensive minerals were given names implying that they were the same as the original mineral, such as synthetic cryolite as a substitute for cryolite.

He urged that the society take some action to find if such practices cannot be legally prevented. The Glass Division went on record by passing a resolution that the society take up the matter with the proper department of the government.

Mr. Hettinger related the difficulties of obtaining colored spectacle lens glass after 1914 and described the method of manufacture now in use; i. e., blowing the glass into spheres or cylinders as window glass and then cutting out the discs. He also gave a number of formulæ for coloring these lenses.

H. H. Blau read a very interesting sketch of an early development of the optical glass industry in this country by Geo. Macbeth of the Macbeth-Evans Glass Company. Mr. Macbeth some twenty years before the world war attempted to make optical glass with the aid of a Mr. Feil, a Frenchman from the famous concern of Feil Bros. who was in this country. The attempt was apparently quite successful from the standpoint of making good glass as several large lenses were made as well as the usual small lenses and prisms required. It was given up, however, because of the inability to compete with foreign producers.

Mr. Gayner's paper described his method of keeping tanks free from scum by skimming the glass just in front of the bridge every Sunday.

At the Bridgeton plant of the Illinois Glass Company the party was turned over to C. H. Modes, general superintendent, and Mr. Brown, superintendent of the Bridgeton plant. Several members of the company acted as guides and thus every one was well taken care of. This plant being rather new was almost ideal in its convenient arrangement and freedom from dirt and hot crowded places. The new batch house with a stationary weighing arrangement and centrally controlled flow spouts from all bins was a new feature of great interest.

The plant was operating four Hartford units for narrow mouth ware and two Owens machines and making both amber and flint glass.

The party left Bridgeton about four o'clock after a very interesting day. They were taken to the railroad station where the party split, some returning to Atlantic City and others proceeding home by way of Philadelphia.

Those taking the trip were:

E. F. Casselman,
J. B. Porter,
E. W. Tillotson,
C. B. McComas,
George Aurien,
W. F. Curtis,
R. J. Montgomery,
James Gillinder,
D. W. Ross,
C. H. Modes,
J. S. McDowell,
Joseph Green,
A. E. Williams.

The meeting of the Glass Division was considered a great success by those present. It is a fine place for superintendents and other glass factory officials to meet the chemists and compare notes, and it is hoped that many not present this time will join the American Ceramic Society and enjoy the next annual meeting.

Trip to the Plants of the Kimble Glass Co. and the Illinois Glass Co.

A very convenient and interesting trip was arranged for the Glass Division for Thursday. The party left Atlantic City at 9 o'clock in the morning and were met at Vineland, N. J. by Mr. Joe Green and Mr. Hood of the Kimble Glass Company. They were taken to the plant in a bus and conducted first through the hand department, forming wares by hand-blown and hand working methods, and then proceeded to the tubing factory where three automatic tube drawing machines were working from one tank.

The party then proceeded to the graduating and lamp-working departments where various kinds of chemical apparatus, vials, ampoules, medicine droppers, etc., were formed and graduated.

This took the entire morning and the party was then entertained at luncheon by H. H. Kimble after which they were driven in a bus to Bridgeton to inspect the Illinois Glass Co. plant.

Those Present

The following attended meetings of the Glass Division:

Name	Address	Business Connection
E. M. Koln	New York	Fagle-Picher Lead Co.
C. A. Scharselm	Pittsfield, Mass	General Electric Co.
T. H. Morris	Huntington, W. Va.	Chas. Boldt Glass Co.
W. R. Babcock	Pittsburgh, Pa.	Laclede-Christy Co.
R. F. Brenner	Parkersburg, W. Va.	Vitrolite Co.
C. W. Berry	St. Louis, Mo.	Mitchell Clay Mfg. Co.
A. G. Wikoff	New York	Chem. & Met. Engineering
W. R. Scott	Rochester, N. Y.	Bausch & Lomb Optical Co.
E. W. Tillotson	Pittsburgh, Pa.	Mellon Inst.
L. M. Moss	Harrison, N. J.	General Electric Co.
C. F. Ryan	St. Louis, Mo.	Russell Engineering Co.
George Aurien	St. Louis, Mo.	Mississippi Glass Co.
H. L. Dixon	Pittsburgh, Pa.	H. L. Dixon Co.
C. B. McComas	Baltimore, Md.	Carr-Lowrey Glass Co.
B. W. Ellis	Baltimore, Md.	Carr-Lowrey Glass Co.
J. M. Zander	Chicago, Ill.	Western Electric Co.
R. L. Clark	Philadelphia, Pa.	United Gas Imp. Const. Co.
Wm. A. Young	Charleroi, Pa.	Macbeth Evans Glass Co.
J. L. Crawford	St. Louis, Mo.	Laclede Christy Clay Co.
C. D. Smith	Washington, Pa.	Simplex Engineering Co.
James Gillinder	Port Jervis, N. Y.	Gillinder Bros. Inc.
G. E. Barton	Millville, N. J.	Whitall-Tatum Co.
G. W. Reed	Chicago, Ill.	Ceramic Industry
E. L. Hettinger	Reading, Pa.	
Jno. D. Carter	Philadelphia, Pa.	Philadelphia Quartz Co.
C. E. Fulton	Tarentum, Pa.	Pittsburgh Plate Glass
C. H. Modes	Alton, Ill.	Illinois Glass Co.
E. W. Washburn	Washington, D. C.	National Research Council
A. N. Finn	Washington, D. C.	Bureau of Standards
A. A. Klein	Worcester, Mass.	Norton Co.
A. Q. Tool	Washington, D. C.	Bureau of Standards
W. F. Curtis	Moundsville, W. Va.	Fostoria Glass Co.
Geo. E. Merritt	Washington, D. C.	Bureau of Standards
R. J. Montgomery	Rochester, N. Y.	Bausch & Lomb Optical Co.
Alexander Silverman	Pittsburgh, Pa.	University of Pittsburgh
H. Blau	Charleroi, Pa.	Macbeth-Evans Glass Co.
Herbert Insley	Washington, D. C.	Bureau of Standards
H. P. Hood	Corning, N. Y.	Corning Glass Works
J. F. McClain	Harrison, N. J.	General Electric Co.
J. T. Littleton, Jr.	Corning, N. Y.	Corning Glass Works
W. C. Taylor	Corning, N. Y.	Corning Glass Works
Donald W. Ross	Washington, Pa.	Findlay Clay Pot. Co.
A. R. Payne	Clarksburg, W. Va.	Hazel-Atlas Glass Co.
A. E. Williams	Elmira, N. Y.	Thatcher Mfg. Co.
H. E. Insley	Washington, D. C.	U. S. Bureau of Standards
H. E. Bellamy	Chicago, Ill.	Western Electric Co.
J. F. Green	Vineland, N. J.	Kimble Glass Co.
F. C. Flint	Clarksburg, W. Va.	Hazel-Atlas Glass Co.

Trip to Coast for Ceramic Society

For the Summer Meeting of the American Ceramic Society a trip has been planned from Chicago through Washington, Oregon and California, and return by optional routes. The trip will last four weeks, the travelers starting from Chicago on July 21 and returning to that city on August 16. Stops are planned at Spokane, Seattle, Lincoln, Cal., San Francisco, Yosemite Valley and Los Angeles. Many places of interest will be visited at stop-off points. Those returning via Santa Fe can stop off at the Grand Canyon.

It is estimated that transportation charges for the entire trip from and returning to Chicago, for a person occupying a lower berth would be approximately $200, to which would be added meals, hotel expenses at stop-over points and various other items.

F. B. Ortman, Glendale, Cal., is general chairman of the Pacific Coast committees. Either Otto Rosenstein or Kenneth M. Henry of the Illinois-Pacific Glass Company, San Francisco, will be a member of the San Francisco committee.

Members may obtain further particulars from Ross C. Purdy, general secretary, Lord Hall, O. S. U., Columbus, O.

The Use of Selenium as a Decolorizer

By R. R. Shively*

Selenium has been used in glass for a long time. In 1894, Mr. Nicholas Kopp[1] made the first selenium ruby produced in this country and since then it has come to be used almost exclusively in glasses of this type. At present, a large tonnage of selenium ruby is being made in day tanks. Selenium is also used quite largely in producing an amber.

In recent years another very large use for selenium has developed. It is now used almost exclusively as a decolorizing agent in tank glass. A number of manufacturers are now marketing selenium decolorized tank glass that compares very favorably with pot glass. It is the purpose of this paper to give, in as concise a manner as possible, the general methods used in obtaining such results.

Before proceeding further, it seems advisable to give the properties of selenium. It is an element resembling sulphur in its chemical behavior. It melts at 425 deg. F. and boils at 1240 deg. F. Selenium burns in the presence of oxygen, giving a bluish flame, forming a gas, selenium dioxide. The amount of selenium required to decolorize a thousand pounds of sand is from one-eighth to one ounce, depending upon the materials used, and the operation of the tank. In order to get accurate weighings of the selenium in such small amounts, it is advisable to dilute it. One part of selenium mixed with seven parts of arsenic is a convenient mixture, each ounce of which contains one-eighth ounce of selenium. The color of selenium glass "burns out" but little and when heavy ware is being made, the "dog house" proof should be water white. In light ware a rose pink color should be carried in the melting end. In taking proofs, it is desirable that successive proofs for comparative purposes be of uniform thickness, and the writer prefers using a small ladle.

On account of the oxidation of selenium, it is necessary to avoid an excess of air in the tank—neither is a smoky flame desirable as the carbon frequently deposits on the glass and gives a brownish to amber-colored glass. The condition in the tank should be as nearly neutral as possible. The writer has found that the hotter the tank runs, the less selenium is required. This is indeed peculiar, but a number of glass men have verified these findings. The explanation of it is possibly to be found in the fact that when the tank is unusually hot, better combustion is being obtained and less selenium is lost by oxidation. It is essential to find the temperature necessary to melt the required amount of glass and then maintain it. In some factories the temperature rarely varies over twenty-five degrees and these factories generally have good glass.

It might be well to mention here that better color, as well as better working glass is obtained when the tank is being worked to capacity. In tanks from which light ware alone is made, in order to get the best results, if hand shops alone are used, it is essential to have the working end of the tank so constructed that a number of shops can be worked, in order to pull the capacity of the tank.

The selection of glass-making materials of low iron content is necessary. Most successful manufacturers have established standards, and do not permit over five-hundredths of one per cent of iron oxide in the sand. The iron in the lime calculated as burned lime is usually specified as not over two-tenths per cent. Feldspar is allowed to have fifteen hundredths per cent iron oxide. Some manufacturers make fair glass from materials which give the glass an iron content of seven-hundredths, but above this, so much selenium is required to produce a complement for the color imparted by the iron, that the resulting effect gives a dark glass.

Too much soda ash gives a glass in which it is difficult to avoid a dark coloration with selenium. Not more than forty-two pounds or its equivalent of 58 deg. soda ash per hundred pounds of sand should be used. While the general practice is to use much less than this, the writer refers to it, as upon several occasions he has found glassmakers using larger quantities.

Salt cake, or lime high in sulphates, which forms salt water in melting, seems to volatilize some of the selenium and in batches containing salt cake, a slightly increased amount of the element is required. Quoting from an article published in the *Journal of the Society of Glass Technology*, by A. Cousen, B.Sc. and W. E. S. Turner, D.Sc. Vol. VI, No. 22, page 174:

"In this connection it is interesting to note that in dilute acid solution at 100 deg., colorless sodium selenite reacts with sulphur dioxide to give selenium itself, the reaction being represented by the equation:

$$Na_2SeO_3 + 2SO_2 + H_2O \longrightarrow Se + Na_2SO_4 + H_2SO_4$$

"The phenomenon of loss of decolorizing power when salt cake is present suggests that at higher temperatures, such as exist in the glass furnace, this reaction is reversed and selenium oxidized by the salt cake."

Niter can be used with selenium, but more of the element is required when it is used, because of the increased amount lost by oxidation, and the escaping gases from the decomposition of the niter may increase volatilization losses.

There is an erroneous belief among glass manufacturers that selenium cannot be used with manganese. Some of the German decolorizers contain both selenium and manganese. The writer's experience with the mixture indicates that more selenium is required when manganese is employed. In one tank when six pounds of manganese was used with twenty-five hundred pounds of sand, over twice as much selenium was required as when no manganese was introduced.

Arsenic is very generally used with selenium in amounts up to five pounds to the thousand pounds of sand. The more arsenic one uses, the more selenium is required. It is therefore essential to weigh the arsenic accurately. Some manufacturers do not use arsenic, but their glass is generally dark in color.

With manganese, a high color is usually carried, which burns out in the lehr. With selenium, if the lehr temperature is too high, the color burns in. The writer has seen lehrs on which the ware next to the fire box was a decided pink, and that in the center of the pans, low in color.

As previously stated, selenium does not burn out in the tank

*Chief Technologist for B. F. Drakenfeld & Co.
[1]Vice-President and General Manager, Pittsburgh Lamp, Brass & Glass Co.

as does manganese, and it is possible to run an over-worked tank hot over Sunday, in order to have good glass with which to begin the week, and still retain the color.

Some limestone contains an appreciable amount of organic matter, which is practically eliminated when the lime is burned. If raw limestone, containing organic matter, is used in the batch, it is necessary to use some oxidizing agent, usually niter, to destroy this carbonaceous matter, otherwise one will obtain a dark colored glass.

Selenium as marketed is of a uniform purity of approximately ninety-nine per cent, but on account of its being volatile and readily oxidized, considerably more care must be exercised in its use than with the more stable selenites. Some of the decolorizing compounds on the market which have as their active constituents various selenites, have been found to be more easily used, and to give much more uniform results at slightly increased cost. The writer recommends the use of these compounds, but in selecting one, be certain that it is made of selenium in chemical combination with some strong base, that is, a selenite of some strong base, rather than a mechanical mixture of selenium which has no advantage over a selenium mixture which can be made in any mixing room. If, when one of these decolorizing compounds is heated gently over a burner, the bluish flame given by selenium is seen, it is a mechanical mixture. The chemically prepared mixtures do not give this flame, which indicates their greater stability.

In closing, it seems desirable to summarize the important points necessary for good results in selenium decolorization:

(1) Use pure and uniform glass-making materials. Know what you are using, as they cannot be too pure.

(2) Furnace control is necessary—do not have a great variation in temperature and try to keep a neutral condition in the tank. Your producer and tank men may say it cannot be done, but others are doing it, and if you give them the equipment, they will do it.

(3) Unless niter or some other oxidizing agent is used in the batch, be sure to eliminate all organic matter, paper, straw, etc., from the glass-making materials and cullet.

(4) Increased amounts of niter, salt cake, manganese cullet and arsenic require more selenium.

(5) If you are not getting results with your own selenium mixture, try a decolorizer where the selenium is in chemical combination.

The Fire Hazard in Glass Works

By Nathaniel Boardman*

To the untutored eye, glass-making plants would seem to offer the fire-demon few chances to perform his malignant work, yet the loss record shows that such establishments are by no means free from destruction by burning.

The Actuarial Bureau of The National Board of Fire Underwriters reports, for example, that the recorded damage to glass works by fire amounted to $5,953,483 during the four years from 1918 to 1921, inclusive, the number of fires aggregating 310.

In 1919, when, according to the Census Bureau, there were but 371 glass plants in the United States, there was 93 fires recorded. Another interesting fact in connection with the statistics of the occupancy was the "insurance at risk" amounting to $17,687,891 as compared with the "sound value" of the properties in which the fires occurred, aggregating $23,865,101. This shows that the insurance coverage represented only about 70 per cent of the value of the plants and contents, which would indicate that many of those who suffered from fire were to some extent co-insurers with the underwriters.

Hazardous Conditions

To return to the fire hazards of glass plants, it has been found that the special fire dangers of the industry are briefly:

1. The storage hazards of raw materials.
2. The grinding and dust hazards while raw materials are being prepared.
3. Fuel hazards, involving natural and producer gas or fuel oil.
4. Hazards due to the arrangement of pot and tank furnaces, glory-holes and pot arches.
5. Annealing.
6. Manufacture of cut glass.
7. The packing and shipping department.

*Of the National Board of Fire Underwriters staff.

The raw materials used in the fabrication of glass do not present any great amount of hazard. Lime that is unslaked should be skidded, however, and stored in a dry place so that it will not undergo hydration and thus generate heat. Charcoal is frequently used as an auxiliary reducing agent and this is subject to spontaneous ignition; consequently it should be stored in closed containers in a dry place, skidded and kept away from extreme heat.

Sulphur and saltpeter should be stored separately, as their admixture, together with carbon, might produce a combination having explosive qualities. The bags containing the saltpeter are likely to ignite spontaneously when stored in piles and after emptying they should, therefore, be removed from the building at once and washed or destroyed. If manganese dioxide is used it should be carefully stored away from all moisture because of its ability to break up water and create free hydrogen, which might cause a serious explosion.

The grinding, screening and mixing of raw materials present but slight hazards although the grinders and other mechanical devices should be kept from contact with woodwork or other combustible material, so as to avoid fires from friction. Proper attention should also be given to the oiling of machinery bearings.

Fuel Dangers

Natural gas, when used for heating the glass furnaces, presents fire hazards similar to those of any system where the gaseous fuel is generated at a point remote from the place of consumption. Measures should be taken to prevent all piping to the burners from receiving mechanical injury and as much of it as possible should be underground. Shut-off valves ought to be located not only near the furnaces but there should likewise be a main valve controlling the entire system at the plant. This should be located in some readily accessible place remote from the furnaces so that it can be

utilized in case of need. If possible, the cut-off should be placed where it could be closed from outside of the building and, needless to say, it should be protected from frost and moisture and from accumulations of rubbish.

If producer gas is employed, the hazard of gas manufacture is added to the situation. When conditions permit, the producer plant, especially if of the pressure type, should be located in a special building of incombustible construction and set apart from the manufacturing group. If space does not permit such an arrangement and it is necessary to locate the gas producer in the main building, the entire unit should be placed in a separate room of fire-resistive construction, well vented to the outside air and with every exit to the main plant protected by automatic fire-doors of approved design.

The unit should be lighted by electricity with all wiring in conduit and with vapor-proof globes inclosing the lamps; switches should be installed outside of the generator room.

The principal hazard of a producer plant is that the gas is explosive when mixed with air; therefore explosions may occur if ventilation is poor and open lamps are permitted.

If illuminating or other pressure gas is used as an alternative supply, the connections should be arranged so as to make impossible the mixing of the two gases.

Where illuminating or other pressure gas supplements the main supply, mixing of the two gases is considered proper if a suitable device is provided to prevent the supplementary gas from entering any part of the producer gas equipment, including the scrubbers or purifier.

The hazards of properly installed fuel oil systems are not appreciably greater than those presented by gas installation. The rules of The National Board of Fire Underwriters in regard to such systems should be carefully followed, however, so that there may be as little danger of fire and accident as possible. Generally speaking, the supply of fuel oil for the ovens and furnaces should be pumped and not fed by gravity, and the piping should be arranged to drain back to the tank, away from the burners. As with gas, the breaking of a pipe line nearly always results in a severe fire, hard to control; this is one of the principal dangers where liquid fuel is used, therefore extreme care is necessary in the installation of the pipe lines. Storage and supply tanks, unless they are isolated and provided with dikes or embankments to restrain the flow of oil, should be buried in the ground and well vented. The pumps supplying oil to the furnaces are best located in a fire-resistive room, well cut off from the furnace section.

HAZARDS OF FURNACES

Buildings housing furnaces kept at high temperatures for long periods should never be of light frame construction, although glass plants of this kind have been employed in some sections of the country. The chief hazard of melting furnaces, whether of the pot or tank variety, lies in the presence of combustible material close to the furnaces. The properly constructed furnace room is built entirely of fire-resistive material, but combustible construction is sometimes seen in older plants and in these establishments arrangements should be made for at least thirty-six inches of floor clearance between the walls of the furnaces and any combustible floor, roof or other surface. It is scarcely necessary to say that the floor of the furnace room should be non-combustible.

THE WORK OF ANNEALING

In several instances, annealing ovens have been encountered with foundations resting on wooden floors and in too close contact with woodwork and fender boards. Obviously such ovens should be of substantial construction and have foundations resting directly on the ground. They should be kept free from contact with combustible materials and located, preferably, like the furnaces, in buildings of fire-resistive construction.

An interesting case occurred a few years ago when a hot blast from regenerating chambers set fire to wooden flooring above. The plant was sprinkled but the water did not hold the flames because they were exceedingly fierce and were above the heads.

MAKING CUT GLASS

In connection with the cutting and etching of glassware, there are a few hazards but they are relatively unimportant. Usually sulphuric and hydrofluoric acids are employed for etching purposes and they should always be stored in a small structure detached from the main group of buildings and kept away from organic material. Melting devices for wax and glue should be safeguarded so that they will not cause fire. Tables used for applying the silver nitrate solution, with which silvered glass is made, are steam heated in most cases and therefore present little danger.

THE PACKING ROOM

In some factories, salt hay only is used, and this is not as dangerous as excelsior, straw or common hay. Because of the considerable quantities used, bins for storage are not practicable but the packing room should be of fire-proof construction; if of frame, it should be lined continuously with sheets of lock-jointed tin, and the place of entrance should be protected with an automatic fire-door of approved type.

The packing room should be located as far as possible from the furnace section and, preferably, it should be in a detached structure. If under the same roof as the main works, the packing room should be cut off from the rest of the plant by standard fire-walls. In all cases, the packing section should be equipped with automatic sprinklers.

Most glass workers are smokers and it is difficult to prevent their indulgence in the weed, particularly in the furnace room. In the packing department, however, smoking is so dangerous that it should be strictly forbidden in that section of the plant.

An examination of a fire record presented by a writer in the "Quarterly" of the National Fire Protection Association, to whom due acknowledgment is made for much of the foregoing material, discloses that three of the fires analyzed were due to glory-holes and pot arches coming in too close contact with woodwork, and that two were caused by the hot molds used in shaping glassware.

Melting furnaces caused a total of 35 fires out of 237; in 20 of the instances the tanks burst and allowed molten glass to ignite combustible material near by. Of eleven fires attributed to annealing ovens and kilns, eight resulted from the overheating of nearby woodwork.

After The Great Quake in Japan

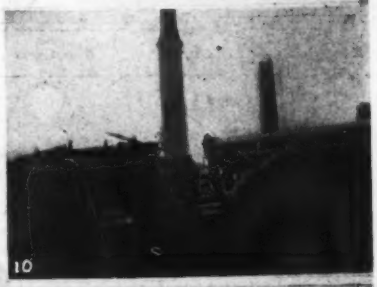
Scenes in the Tsurumi factory of The Asahi Glass Company, Limited, which escaped the flames and partly survived the earthquake shocks of last September.

THE photographs reproduced here through the courtesy of Mr. A. Misumi, manager of The Asahi Glass Company, Limited, of Tokio, give a comprehensive idea of the appearance of a glass factory after a visit from an earthquake. When transmitting the prints, Mr. Misumi wrote that his company considered themselves very fortunate in having suffered such slight damage, both in human lives lost—only four of their workmen met death—and in property, in comparison with the sufferings of numerous other factories in the devastated region, some of which were completely demolished, with heavy loss of life. Among them was a bottle factory where four Owens automatic machines were in use. Its four tanks collapsed and the entire equipment was destroyed.

In the Tsurumi factory, the melting tank and its building escaped injury except that about 90 tons of glass leaked out from the bottom of the tank. Nevertheless, the severity of the shocks is indicated by the fact that the chimneys, even those built of reinforced concrete, and all the wooden buildings were destroyed.

Key to Pictures

1. Fireproof partition wall of the warehouse.
2. Brick chimney for flattening ovens.
3. Flattening ovens.
4. Clay house.
5. Gas producers, with bunkers in foreground, main chimney to left badly damaged, storage bins for raw materials in center of picture and tank building to the right.
6. Gas producers with coal bunkers
7. Building for flattening ovens.
8. Material landing wharf.
9. Ground sliding inside the warehouse.
10. Power house and main chimney.
11. Flattening ovens.
12. Lehrs of the flattening ovens.
13. Factory office and canal.



The Glass Industry

The First Technical Trade Journal Devoted Primarily to Glass Technology, Engineering, Raw Materials, and Glass Factory Equipment and Operation.

Published Monthly by the
GLASS INDUSTRY PUBLISHING COMPANY, INC.
50 Church Street, NEW YORK

Telephones { Cortlandt 2465 / Cortlandt 5618 — Cable Address, Glasdustry

J. B. KRAK, Technical Editor

Subscription Price.....$2.00 a Year
Single Copy.....20 Cents

THE GLASS INDUSTRY circulates extensively among American and foreign glass manufacturers, their business executives and technical and factory operating staffs.

ADVERTISING RATES SENT ON REQUEST

Vol. 5 NEW YORK, FEBRUARY, 1924 No. 2

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CLASSIFIED BUYERS' GUIDE, PAGE 16

Readers of THE GLASS INDUSTRY in the United States and elsewhere are requested to favor the Editor with any information available from time to time concerning developments in their own or other fields which would be of general interest to the industry. Authoritative facts about new glass manufacturing projects, re-organizations, new factory construction, new processes and equipment, raw materials, manufacturing and market conditions, personal items, and other appropriate subjects would be welcomed.

Those experienced in the practical, technical or executive activities of glass manufacturing who are qualified and willing to lend their aid to the upbuilding and progress of the industry by giving from their store of knowledge to others, are invited to submit for publication articles on any subjects relating to glass which would be of interest and value to our readers. The authors of accepted articles of this kind will be compensated at usual rates.

Price Concessions to Quantity Buyers

The custom prevailing among manufacturers of various commodities of making price concessions to buyers who order in large quantities has in the course of years become so well established, and the principles upon which the custom is based have been so widely accepted that very few manufacturers nowadays give a thought to the matter or stop to consider whether or not the practice is in general a sound one and, in particular, whether it is beneficial in the long run to their own organizations.

Discussing the question recently, a writer in *The Iron Age* stated that in the steel business the trend for some time past has been toward the reduction of differentials or concessions. Obviously, if it costs less to make, sell and deliver in large quantities a discount should be given to the buyer who is in a position to place large orders. The question is, does the average manufacturer take too narrow a view of the meaning of the word cost? Does he give full consideration to the fact that the larger his star customer's orders are, the greater will be the confusion caused and the higher the readjustment costs should that customer be lost and a revision of the factory production system become necessary,—a possibility that is almost sure to eventuate into a certainty sooner or later.

As pointed out by the writer referred to above, "If the customer is taken on when orders are easy to get and is lost when orders are hard to get, the expense of the transaction is large. To make room for the large customer some very good small customers may have to be dropped, and it is difficult to get them back in a weak or oversupplied market. . . . Moreover, in poor years the large buyer has more assurance, in seeking a concession as the price of continued patronage, than the small buyer."

The large consumer requires special service; only a limited number of manufacturers in any given field are equipped and organized to give it. He is more restricted than the small buyer, who if not satisfied with the service he gets from the manufacturer with whom he has placed his contract, can readily find other manufacturers or jobbers able and willing to see him through.

To give the large buyer the service he must have, to be equipped and organized to do all that is humanly possible toward carrying out the letter and the spirit of the contract, costs more than to provide only ordinary service. When the big buyer of glass products makes his demand for special consideration, it may be well to inform him of these facts and tell him that he gets his concession "not in price, but in service."

Civil Service Examinations

Open competitive examinations for junior engineer, junior physicist, and junior technologist will be held at various points on March 5, by the U. S. Civil Service Commission. Vacancies in the Bureau of Standards, for duty in Washington, D. C., or elsewhere, at $1,200 to $1,500 a year (plus "bonus"), and in positions requiring similar qualifications, at these or higher or lower salaries, will be filled from these examinations. Full information may be obtained by writing to the Commission at Washington, D. C.

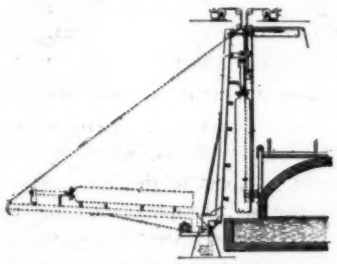
Recent Patents

NEW INVENTIONS DESIGNED TO IMPROVE GLASS AND THE MEANS OF PRODUCING IT

Copies of United States Patent Specifications may be obtained from the Commissioner of Patents, Washington, D. C. Price 10c each

Apparatus for Drawing and Taking Down Glass Cylinders. U. S. 1,480,188. Jan. 8, 1924. Arthur E. Spinasse, of Mount Vernon, O.

This invention relates to process and apparatus for drawing and taking down glass cylinders. Glass, in a glass tank, is always of variable quantity as to composition and consistency, and this variation is accentuated by conditions in the glass factory where drafts are of constant occurrence and where these drafts chill the walls of the cylinder as they strike the latter, invariably in accordance with the speed, direction and temperature of such drafts. Other conditions also modify the cylinder being produced. The bottom of the cylinder, the genesis of it, may start to travel also across the path from one side to the other.



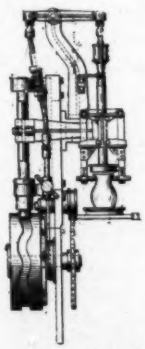
The inventor has discovered that by varying the path of the bait during draw, he may counteract, to a large extent, the effects of these variation producing causes, and has accordingly devised a frame upon which the track over which the traveling carriage is mounted, which frame can be adjusted in position either vertically, horizontally or obliquely, in any direction, so as to give the track over which the bait carriage moves, a path adapted to carry the bait out of the perpendicular in a given direction so as to afford some compensation for the influences indicated above.

He has also devised means whereby the take-down frame may be moved into proper position with respect to the cylinder, means whereby the cylinder may be transferred to the take-down frame without jar, and means whereby the take-down frame may approach its final position under gentling or steadying influence and stop without jar.

He has also invented a bait of a construction adapted for use in conection with the apparatus described.

Glassworking Machine. U. S. 1,478,261. Dec. 18, 1923. Theodore H. Sloan, of Charleroi, Pa., assignor to Macbeth-Evans Glass Company, of Pittsburgh, Pa.

The invention relates to apparatus and machines for finishing glass articles in a heated condition, and is particularly applicable to machines for crimping the upper ends of lamp chimneys after they have passed through a heating furnace.



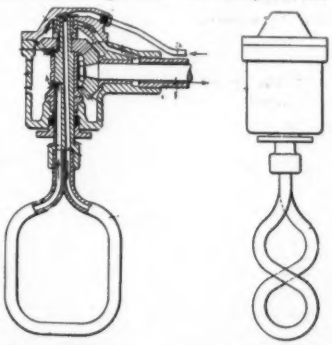
The machine in its preferred form comprises a frame provided with a carrier which is movable to and fro parallel to the conveyor and in line of its advance. Borne by the carrier, there is a finishing tool mounted for reciprocatory movement toward and from the conveyor. Separate connections are provided between the conveyor and the carrier and tool for co-ordinately effecting their movements in both directions and at the proper times with relation to the advance of the conveyor. These connections, as well as the support for the carrier, are provided with suitable adjustments so that the carrier may be positioned, and the tool properly operated, at any desired distance from the conveyor, the distance depending upon the size of the articles being finished. The machine also includes an article-positioner which successively engages and brings the articles, carried loosely in the saddles of the conveyor, to the proper position with relation to the tool before the tool is moved into engagement with the article, and which also holds each engaged article upon the conveyor until after the tool has been disengaged from the article.

Method of Ornamenting Glass Articles. U. S. 1,480,834. January 15, 1924. Louis B. Newell, of Baltimore, Md.

The inventor claims a method of ornamenting glass articles, such as bottles, which consists in forming on a surface of the article projecting portions forming a design, subsequently frosting both the raised and sunken portions of said surface at one operation by sand blasting or other means, and finally buffing the projecting portions of the surface to render the design transparent and leave a frosted background.

When the bottle is filled with a colored liquid these transparent lines of the design will stand out with even greater prominence, when the design will have the appearance of being etched on the bottle and a container having a high grade appearance can thus be produced in an inexpensive manner.

Means for Stirring Glass. U. S. 1,479,511. Jan. 1, 1924. Charles Algernon Parsons, of Newcastle-on-Tyne, England.

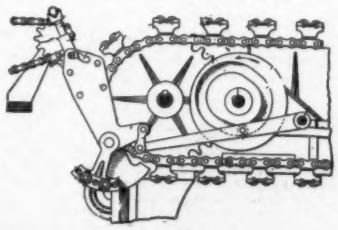


The object of the invention is to secure a much more thorough stirring of the glass than has been possible with devices in use heretofore without the entrainment of air, or in other words, to enable a much greater power to be applied in the process of stirring.

The invention consists in imparting to the stirrer a rapid rotary motion about its own axis with or without a relatively slow orbital movement, and also in a stirrer constructed from a simple or complex loop of metal tube, as illustrated.

Transfer Mechanism for Vial-Working Machine. U. S. 1,479,809. Jan. 8, 1924. Benjamin T. Headley, Parke H. Thompson, deceased, by Rena M. Thompson, Executrix, and David Irvin Du Bois, all of Millville, N. J., assignors to Whitall-Tatum Company, of Millville, N. J.

This invention relates particularly to a mechanism of the type adapted to transfer vial blanks from a vial necking machine to a vial bottoming machine, although its use in this respect is not limited.



An important object is to provide a transfer mechanism adapted to be operated in timed relation to a plurality of carriers for automatically transferring blanks from one carrier to the other.

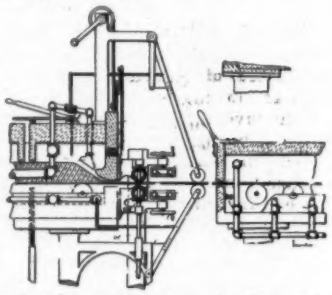
Another object is to provide a transfer mechanism of the character described adapted to raise blanks from suitable support on one carrier, transfer the same to supports on

another carrier, and then lower the same into engagement therewith.

Still another object is to provide a feed device for vial working machines adapted to feed vial blanks thereto in timed relation to the operation of the machine.

Glass Manufacture. U. S. 1,478,554. Dec. 25, 1923. Robert M. Corl, of Maumee, Ohio, assignor, by mesne assignments, to Erie Glass Company, of Toledo, O.

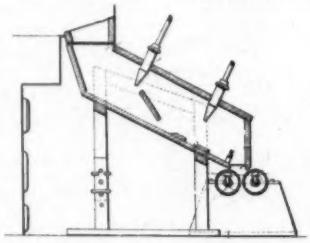
This invention has utility in the manufacture of glass, especially sheets for continuous production.



Among other claims of the inventor are, in combination, means for advancing a set mass of glass, means for applying a converting heat to the forward end portion of the mass to flow therefrom a sheet of lesser thickness than the mass, means for carrying away the sheet as it flows from the mass, means acted on by the sheet to regulate the heating means to maintain a substantially uniform flow of glass from the mass, and means for supplying glass to the rear end of the mass to maintain its continuity and the continuity of flow of glass therefrom.

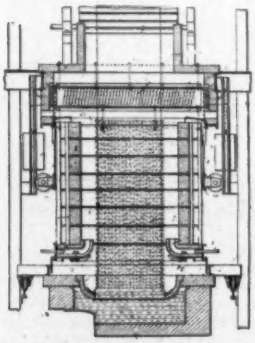
Machine for Making Glass Sheets. U. S. 1,479,295. Jan. 1, 1924. Edward Gregory, of New Eagle, Pa.

Machine for making sheet glass comprising a chute provided with an inlet and with an outlet, and spaced deflectors secured to the bottom thereof and inside of the same for spreading the molten glass over the entire surface of the bottom before it is discharged from the chute and onto the cooling rollers; also a machine for making glass comprising a chute for the molten glass to pass through, said chute being formed at one end with an inlet and at its opposite end with a discharge opening, and a comb-like member secured to the chute adjacent the discharge opening for compelling the molten glass to pass through the discharge openings in small jets; also a valve arranged in the chute for controlling the flow of the glass.



Apparatus for Drawing Sheet Glass. U. S. 1,480,625. Jan. 15, 1924. Robert A. Miller, of Creighton, Pa., assignor to Pittsburgh Plate Glass Company.

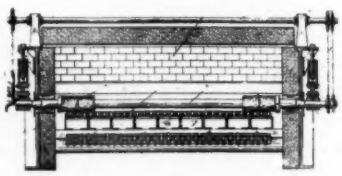
This invention relates to improvements in sheet glass drawing apparatus. It has for its principal objects the provisions of a temperature stabilizing or equalizing means for the sheet during its initial formation, and during the period in which its temperature is gradually reduced as the drawing progresses.



The invention involves the use of a metallic curtain which extends from a point adjacent the glass to a point which is as far above the surface of the glass as the requirements of the case call for, such curtain preferably entirely surrounding the sheet, although this is not necessarily the case. The curtain is of a flexible open-work construction, preferably made up of links. This curtain surrounding the sheet stabilizes and equalizes the temperature of the gas envelope inside the curtain, so that sudden changes of temperature along the length of the sheet are avoided. The curtain is preferably employed inside of a lehr casing to which heat is supplied from a molten bath and also ordinarily from additional heating means, so that the curtain attains a relatively high temperature throughout its length. The curtain thus provides a reservoir of heat, and drafts or inequalities of temperature which may arise inside the lehr casing are prevented from being rapidly transmitted to the glass sheet by reason of the interposed curtain which permits a ready flow of gas or heated air there-through, but tempers such air or gas in its passage.

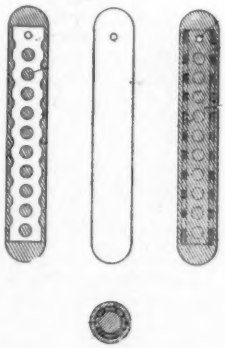
Apparatus for Drawing Sheet Glass. U. S. 1,481,218. Jan. 15, 1924. Otto C. Miller, of Charleston, W. Va., assignor to the Libbey-Owens Sheet Glass Company, of Toledo, O.

Among the inventor's claims in a machine for drawing sheet glass from a source of molten glass, is the combination of a stationary table having a flat horizontally extending surface, with a driven endless drawing table composed of a plurality of series of longitudinally extending links with the links of one series in close juxtaposition to those of the adjoining series and with the pivotal portions of the links in adjacent series alternating, and means for driving said drawing table with its horizontal run resting upon and supported by said stationary table, the glass sheet being carried by and flattened upon said drawing table, and a plurality of positively driven rollers above the drawing table for engaging the upper edge portions of the sheet and assisting in the sheet drawing operation.



Plug for Glass Machines. U. S. 1,480,991. Jan. 15, 1924. Charles W. Casto, of Washington, Pa.

In the construction of an improved plug, the inventor uses a hollow metallic reinforcement which is provided with a series of perforations or openings. The interior of this reinforcement is then filled with fire-clay, which projects out through all of the perforations or openings when same is coated or covered over the entire surface with fire-clay, which cements itself with the projecting portions of the clay, making a smooth, round plug.



Process for Making Glass Plate Letters. U. S. 1,479,801. Jan. 8, 1924. Adolph W. Gast, of Chicago, Illinois, assignor to Chicago Miniature Lamp Works, of Chicago, Ill.

The invention relates to improvements in a process and apparatus of the kind heretofore disclosed in Letters-Patent 1,308,408 granted on July 1st, 1919.

This process of making glass-letter-plates consists in heating supporting plates, some of which have glass blanks thereon, by advancing them through a furnace in which they are subjected to zones of heat of progressively increasing temperature until the glass blank is heated to a condition in which it is pliable and workable against a die, of then subjecting the glass blanks to pneumatic pressure exerted upwardly through the supporting plates, against a die, which has been heated to a temperature approximating that of the glass plate, of dislodging each glass letter plate from its supporting plate to break any bond between them, of then subjecting the glass letter plates to the process of annealing by passing the same through an annealing oven from the hotter to the cooler end thereof, and in maintaining a proper temperature in the hotter end of the annealing oven by means of supporting plates which have been passed through the furnace without any glass blanks thereon.

Glass Factory Equipment and Supplies

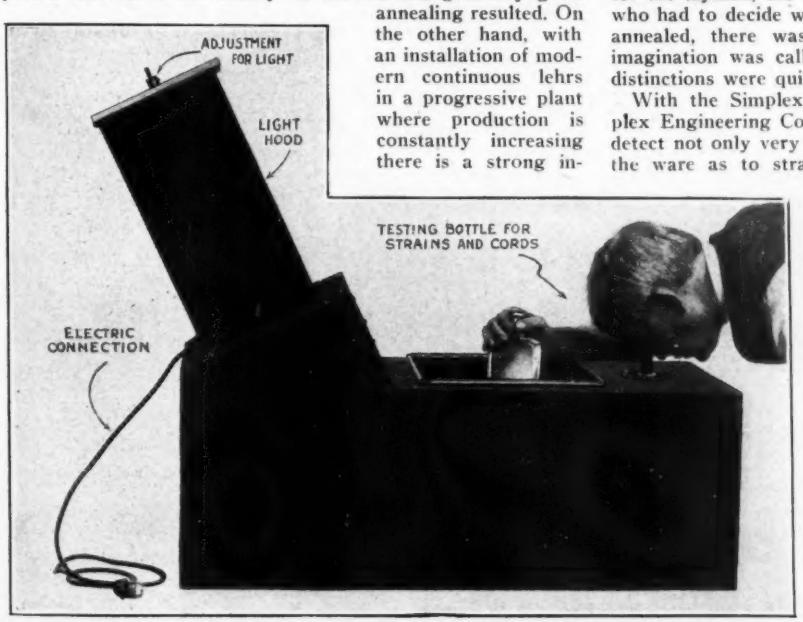
THE GLASS INDUSTRY will be glad to publish descriptions of new and useful devices, machinery and supplies of interest to the glass manufacturing trade. Most of the information printed in this department comes direct from the manufacturers of the products described.

The Simplex Polariscope

By Carl D. Smith*

Years ago much of the annealing of glassware was done in kilns and for the most part the results were satisfactory but the operation was slow and would not permit of quantity production on a scale even approaching common practice of today.

Another type of furnace used for annealing glass was one in which the ware was placed in pans that moved progressively from the hotter parts of the furnace to cooler and still cooler parts until they reached a point where the ware could be handled with the bare hands. The development of this type of furnace is seen in the modern continuous lehrs of the present day. With this development has come the possibility of greatly increased capacity but at the same time the liability of greatly decreased effectiveness in annealing. With the kilns the cycle of operation was often two or three days, with a long cooling period that could not readily be hurried and generally good annealing resulted. On the other hand, with an installation of modern continuous lehrs in a progressive plant where production is constantly increasing there is a strong inclination to speed up the lehrs until the limit of safety is not only reached but passed unless there is some reliable means of knowing those limits. Again, different classes of ware require different rates of lehring for commercial annealing, for example, thin blown tumblers require much less time than an article having thick heavy walls; and in order to get the full capacity of the lehrs it is necessary to know the lehring rates for the different classes of ware. This cannot be readily determined without some reliable means for making the annealing inspection.



It is not intended to convey the impression that the properly designed modern lehrs cannot anneal glassware as thoroughly as the kiln, for it can and in much less time and furthermore, one article may be as well annealed as another in two-thirds the time. But these distinctions cannot be determined and the advantages resulting therefrom made available without reliable annealing inspection.

To the unaided eye bottles that have been through a lehr and those that have not look the same, but under special light conditions such as are produced with a polariscope there is a marked difference in the appearance and such an instrument is thus naturally suggested as a means for making annealing inspections.

Polariscopes involving the same general principles but differing in details of design have been made for many years but their use in the glass industry has not been general. With the constantly increasing need for such an instrument, however, there has been during the last few years a considerable number installed in the glass factories, but their use has not been altogether satisfactory. It was easy enough to see the difference between ware that had been annealed and ware that had not and in the hands of a physicist or other highly trained expert consistent determinations could frequently be made. But for the layman, the man who was sorting the ware, the man who had to decide whether or not the ware was commercially annealed, there was much to be desired. Too often the imagination was called into play in making decisions. Fine distinctions were quite out of the question.

With the Simplex Polariscope, manufactured by the Simplex Engineering Company, Washington, Pa., it is possible to detect not only very slight strains with certainty but to grade the ware as to strain within the limits of commercial annealing; such grades to be designated by number, letter or any other method that is desirable. For example, all ware showing no strain may be designated A grade; that showing a slight strain as B grade; and that showing rather more than the B grade but which is still within the limits of commercial annealing as C grade; while into the D grade may be placed all such ware as is unsuitably annealed.

The essential parts of the Simplex polariscope consist of the polarizer, tank for refractive index solution, quarter wave plate and analyzer. These parts are arranged in a wooden cabinet and form a compact outfit. The source of light is from a bank of four lamps which may be connected to any lamp socket.

The tank for the refractive index solution is 12 inches square and 12 inches deep and is therefore large enough for the usual lines of glassware. This tank is fitted with plate glass windows through which the polarized light passes. The refractive index solution may be made up to suit the ware being inspected but for all ordinary purposes water serves exceedingly well, preferably distilled water; but if this is not readily available clean clear water is suitable and eliminates all hazardous and disagreeable features.

This feature involving the use of a tank filled with water or other solution enables one to inspect bottles, jars and in fact any hollow ware with certainty, since the distortion ordinarily produced in the light rays in passing through such ware is largely eliminated. For an analyzer, use is made of a nicol prism. This is fitted with an eye piece through which observation is made when inspecting ware. In the new polariscope a quarter wave plate is introduced between the polarizer and analyzer and it is the tuning and adjusting of this plate that makes of the whole outfit a new instrument.

With a few hours' practice in judging ware of the different grades the beginner will be able to discriminate with remarkable exactness the annealing of samples submitted to him.

*Of Simplex Engineering Company.

The Glass World and What It Is Doing

News of the Industry

Standard Plate Glass Securities Listed

Securities of the Standard Plate Glass Corporation were recently listed on the Pittsburgh Stock Exchange to the extent of one hundred thousand shares of common stock of no par value and $2,300,000 par value of first and refunding twenty-year 6½ per cent sinking fund gold mortgage bonds.

On January 31, when trading began on the Stock Exchange the common stock opened at 25, went up quickly to 27, then reacted slightly. Preferred shares sold on the Pittsburgh Curb at 88. The 6½ per cent bonds opened at 98½ and went to 99.

In the application for listing some interesting facts and figures concerning the corporation were given. The capitalization is as follows:

	Par	Capitalization. Authorized.	Outstanding.
Common stock	None	*100,000	*100,000
Preferred stock	$100	$6,000,000	$4,125,000
First and refunding 20-year 6½% sinking fund gold mortgage bonds		3,000,000	2,300,000
7% convertible 10-year sinking fund debenture bonds		1,250,000	1,250,000
Heidenkamp Plate Glass Corporation first mortgage 6½% 20-year sinking fund gold bonds		1,000,000	†700,000

*Shares.

The bonded debt is $2,300,000 of first and refunding 20-year 6½ per cent sinking fund gold mortgage bonds. Authorized, $3,000,000. Dated September 15, 1923. Due September 15, 1943. $1,250,000 of 7 per cent convertible 10-year sinking fund debenture bonds. Dated September 15, 1923. Due September 15, 1933.

The Standard Plate Glass Corporation, new company, profit and loss account for the three months ending November 30, 1923, follows:

Gross sales			$1,681,309 12
Deduct—			
Freight and allowances	$ 7,486 82		
Discounts	13,363 01		
		20,849 83	
			$1,660,459 29
Deduct manufacturing cost of sales (including depreciation)			964,465 65
			$ 695,993 64
Add—			
Company house rent	$409 64		
Less company house expense	587 98		
		$ 178 34*	
Purchase discounts		4,127 62	
Interest earned		2,086 74	
Dividends received		11,747 25	
Miscellaneous		3,862 24	
Inventory adjustment		11,859 63	
			33,505 14
			$ 729,498 78
Deduct administrative, general and selling expense			154,940 05
			$ 574,558 73
Deduct—			
Experimental work		$ 3,729 48	
Bond interest		61,693 74	
Bond discount amortization		8,440 32	
Provision for Federal income tax		56,807 58	
Loss on dismantling buildings and equipment		18,878 10	
			149,549 22
			$ 425,009 51

*Loss.

The officers of the corporation are: Joseph Heidenkamp, chairman; Frank E. Troutman, president; Warren Hires Turner, vice-president and treasurer; Joseph Heidenkamp, Jr., secretary.

Directors—Joseph Heidenkamp, Joseph Heidenkamp, Jr., James R. Miller, Frank R. Frost and Warren Hires Turner of Pittsburgh; Frank E. Troutman and A. C. Troutman of Butler, Pa.; Louis A. Hippach, Chicago, Ill.; Neilson Edwards, Stanhope S. Goddard and Howard F. Hansell, Jr., of New York.

Hand Plants to Operate

The list of window glass plants using hand methods which will operate this blast, revised to January 21, includes:

Alliance Window Glass Company	Salem, W. Va.
Connelly Glass Company	Caney, Kan.
Cross Glass Company	Lovell, Wyo.
Dunkirk Window Glass Company	S. Charleston, W. Va.
Harding Glass Company	Fort Smith, Ark.
Illinois Window Glass Company	Danville, Ill.
Independent Glass Company	Sistersville, W. Va.
Jeannette Window Glass Company	Point Marion, Pa.
C. F. Lutes Glass Company	Hermosa Beach, Cal.
Mountain State Window Glass Company	Mannington, W. Va.
Patterson Glass Company	Cameron, W. Va.
Penn Window Glass Company	Pennsboro, W. Va.
Premier Window Glass Company	Pennsboro, W. Va.
Salem Co-operative Glass Company	Salem, W. Va.
Twin City Glass Company	Texarkana, Tex.
Utica Glass Company	Utica, Ohio.

Some of the plants which have announced that they will not operate are as follows: Doddridge Window Glass Company, West Union, W. Va.; Ideal Window Glass Company, West Union, W. Va.; Interstate Window Glass Company, Weston, W. Va.; Norwood Window Glass Company Clarksburg, W. Va., and Sunflower Glass Company, Sapulpa, Okla.

Glass and Pottery Association Elects Officers

The Associated Glass & Pottery Manufacturers on January 22, elected the following officers: President, Charles H. West, of the Westmoreland Glass Co.; vice-president, D. Harry Cushwa, of the United States Glass Co.; secretary, Charles L. Sebring, of the Sebring Pottery Co., Sebring, O.; treasurer, George H. Brush, of the Brush, McCoy Pottery Co., Zanesville, O.; assistant secretary, J. M. Hammer, Pittsburgh, Pa. The board of directors consists of the officers and Kirk Bryce, of Bryce Bros., Mt. Pleasant, Pa.; Charles C. Ashbaugh, of the West End Pottery Co., East Liverpool, O.; Harry A. Ross, of the Pittsburgh Lamp, Brass & Glass Co.; Harry B. Duncan, of Duncan, Miller Glass Co., Washington, Pa.; W. C. McCartney, of the Cambridge Glass Co., Cambridge, O. An educational campaign to further the use of American glass and pottery is being considered by the Association.

William C. Buell, Jr., Joins Chapman-Stein

The Chapman-Stein Furnace Company, of Mt. Vernon, O., designers and builders of the Stein recuperative and other industrial furnaces, announce the addition of William C. Buell, Jr., to their engineering staff. Mr. Buell has had a broad training along combustion lines and a very valuable practical experience in furnace designing and construction. From 1906 to 1914 he served as engineer for the Westmacott Furnace Company. Until 1917 he was engineer of tests for Tate-Jones & Company, Inc. From 1917 to 1919 he was a member of the United States Army Engineers Corps. Fifteen months of this period were spent overseas. From 1919 to 1920 he held the position of chief engineer for Tate-Jones & Company, Inc., and was in charge of design, erection, esti-

mating and laboratory. Then until 1922 he was chief engineer for the George J. Hagan Company, where he designed a line of heating furnaces for all purposes and a complete line of combustion equipment for fixed fuels. Since then he has spent a year as a member of the firm of Buell, Schieb, Mueller, Inc., who specialized in furnace design and investigations of the factors affecting the use of various fuels in the basic industries.

Mr. Buell is a member of the American Society of Mechanical Engineers, Society of American Military Engineers, Engineers Society of Western Pennsylvania, and is a registered Professional Engineer in the State of Pennsylvania. He still retains a captaincy in the Engineers' Reserve Corps of the United States Army.

Macbeth-Evans Changes

Howard S. Evans, has been elected to the presidency of the Macbeth-Evans Glass Company, succeeding his father, Thomas Evans, whose death occurred early in December. The new president has for several years filled the vice-presidency, which is now taken by George D. Macbeth, son of the late George A. Macbeth, the first president of the company.

An important change is being made in the administrative policy of the company, two divisions, known respectively as the Eastern and Western Divisions having been established. The Eastern Division with headquarters at Charleroi, Pa., will be in charge of Vice-president George D. Macbeth. The Western Division will be centered at Marion, Ind., with C. R. Peregrine, who has been made a vice-president, in charge. Each division will control its own production, sales and other activities. The general office at Pittsburgh will be relieved of all manufacturing, purchasing sales and collection activities and will be devoted exclusively to executive and financial matters.

Seventeen Glass Stock Swindlers Sentenced

The thirteen defendants convicted of using the mails to defraud investors in the stock of the Glass Casket Corporation of Altoona, Pa., and the four who pleaded guilty when placed on trial recently in the Federal Court at New York were sentenced to terms of imprisonment ranging from one day to two and a half years.

The four who pleaded guilty were Benjamin Crager, president of the Crager System, Inc., which conducted the stock sale, who was sentenced to six months in Essex County (N. J.) Penitentiary; his father, Henry Crager, sentenced to one day in the Tombs, and Samuel Rosenblatt, a Chicago attorney, legal adviser of the Crager System, and Henry Sideman, officer of the Crager concern, each sentenced to eighteen months in Atlanta Penitentiary.

Samuel Safir, principal stockholder in the Crager concern, was sent to Atlanta for two and a half years.

The other defendants were sentenced to varying terms. About sixty persons were originally under indictment in this case but as the trial proceeded the charges against certain of them, including S. W. Manning, president of the Glass Casket Corporation, were dropped.

Will Sell "Wyandotte" Products Direct

The arrangement which has existed for years between the Michigan Alkali Company and Edward Hill's Son & Company, by which the sales of the well-known "Wyandotte" products—soda ash, caustic soda and bicarbonate of soda—manufactured by the former were handled by the latter, was terminated December 31, 1923. The personnel that directed the distribution of Wyandotte products through Edward Hill's Son & Company continues to do so under the direction of E. M. Taylor, director of sales of the Michigan Alkali Company, with selling headquarters, known as the general sales department, at 21 East 40th street, New York.

Mr. Hill will focus the attention of Edward Hill's Son & Company on their other products: Antimony metal, antimony oxide, citronella, timonox and arsenic.

G. M. Dunning of the Michigan Alkali Company will continue to make his headquarters in New York.

Stinnes' Factory Buys American Equipment

Reports from Berlin giving the information that interests controlled by Hugo Stinnes, the prominent German industrialist, have obtained licenses for the use of American glass-making machinery in a new $1,000,000 factory now being built at Karnap, near Essen, were corroborated on January 9 by H. L. Dixon, president of the H. L. Dixon Company, Pittsburgh, Pa., contractors for the construction work. Twelve furnaces, four of them for the manufacture of bottles and two for electric light bulbs will be built. Westlake bulb and Danner tube drawing machines will be used. A shipment of Lynch bottle machines, has already been made and others will soon follow. Tucker-Reeves-Beatty feeders have been arranged for. Negotiations are said to be under way for licenses to use the Owens bottle machine and Libbey-Owens process for sheet and plate glass manufacture.

Glass Cutters' League Elects New Officers

The Window Glass Cutters' League of America recently elected and installed the following officers for the current year: President, O. B. Cline; secretary-treasurer, Harold Osmond; executive board members: Chester Harrison, Hugh Fairfield, Herbert Westcott and R. E. Ireland. The wage committee members are: Martin Whiteman, Lancaster, O.; Louis Cheesman, Charleston, W. Va.; Ray McKee, Shreveport, La., and Joseph Quinet, Charleston, W. Va. The headquarters of the League have been moved from Charleston, W. Va., to the Atlas Building, Columbus, Ohio. Announcement has also been made by Secretary H. Osmond, that a monthly magazine which will be of interest to all window glass cutters will be issued by the League in the near future.

Changes in Owens Bottle Organization

William H. Boshart has resigned from the directorate of the Libbey-Owens Sheet Glass Company, and been elected executive vice-president and general manager of the Owens Bottle Company to which he will devote all of his time. He succeeds James C. Blair who resigned with the object of devoting all of his time as executive vice-president and general manager to the Libbey-Owens Company and its subsidiaries. C. J. Wilcox succeeds Mr. Boshart on the Libbey-Owens board of directors. Frank P. Kennison of the Ohio Savings Bank and Trust Company, Toledo, O., has been chosen to fill the vacancy on the board of directors of the Owens Bottle Company caused by the recent death of Michael J. Owens.

W. J. Miller Has New European Representative

Joseph Kelaher, a glass expert of 28 years' practical experience with modern glass machinery and production methods, sailed for England early in January to take over the management of the European sales and installations of Wm. J. Miller, the glass machinery manufacturer of Swissvale, Pa. Mr. Kelaher will establish temporary headquarters at London, and will have under him a staff of experienced installation men. He is no stranger to the European glass trade, having been in charge of the Garston Bottle Co., Ltd., Liverpool, and traveled extensively in Europe. He was for twelve years, an executive for the Dominion Glass Co., Canada, also for four years with the Consumers' Glass Co., Montreal. He speaks French and English fluently, which will be invaluable to Mr. Miller's French clientele. Mr. Kelaher not only has a practical knowledge of modern glass machinery, but also of modern factory management and tank building as well.

Mr. Miller reports that the past year has been the most prosperous in his experience, and that his sales were three times as great as in any previous year.

Window Glass Workers Lease Factory

Officials of the National Window Glass Workers' Association have decided to enter the business of glass manufacturing through a new corporation known as the National Window Glass Manufacturing Company capitalized at $150,000. The Camp factory at Huntington, W. Va., has been leased from

the Interstate Window Glass Company. The lease runs until the end of May, 1925 The officers of the new company are: Thomas Reynolds, president; Fred Vandergrift, vice-president; Walter A. Coy, secretary and treasurer; Jacob C. Montross, George Rozzell. Frank J. Henisee, recently with the Libbey-Owens Sheet Glass Company, at Charleston, W. Va., is manager.

It is the intention of those interested to take over one or two additional plants each year.

The Exhibit at Pittsburgh

The power of the Pittsburgh Glass and Pottery Exhibit to draw visitors from all over the country as well as from foreign lands was never more conclusively demonstrated than at the forty-fourth annual show which closed January 26. This was the first exhibit to be held under the control of the Associated Glass and Pottery Manufacturers and the results of better organization and more active promotion efforts were plainly evident. Buyers were plentiful and active and orders for enormous quantities of glassware and pottery were placed, practically every exhibitor sharing in the passing out of the "plums."

Western Glass and Pottery Officers

Reuben Haley of Pittsburgh, Pa., general factory manager of the United States Glass Company, has been elected president of the Western Glass & Pottery Association for 1924.

Other officers are: Vice-presidents, Albert Binswanger of Pittsburgh, William J. Lynch and F. J. Simmons of East Liverpool, O.; secretary and treasurer, W. W. Lang of Cambridge Springs, Pa.; directors, John H. Harris and F. A. H. Lang of Pittsburgh, J. Howard Fry of Rochester, Pa., James M. Lewis of Coraopolis, Pa., David Cuslin of Pittsburgh, John L. Vodny of East Liverpool, Robert Y. West of Pittsburgh and J. I. Irwin of East Liverpool.

Ford's New Glass Plant in Operation

The last of the four continuous pouring plate glass making units built at the River Rouge, Mich., plant of the Ford Motor Company was put into operation early in the year and the quartet of furnaces is now turning out large quantities of quarter-inch windshield plate. The process in use is essentially that developed in Ford's Highland Park plant in Detroit, though refinements and improvements have been made in methods and equipment.

A full description of the process and illustrations of the equipment used was published about a year ago in the January, 1923, issue of THE GLASS INDUSTRY.

Verified News of Trade Activities

The Elizabeth Glass Company, Elizabeth, N. J., has been incorporated by Frank S. Weiner with a capital of $10,000.

A fire on January 14 caused considerable damage to the cut glass factory of **T. G. Hawkes & Company,** Corning, N. Y.

The American Window Glass Company, Pittsburgh, Pa., has granted an increase of 8 per cent in wages to their window glass cutters.

The Graham Glass Company's bottle factory at Okmulgee, Okla., resumed operations recently after a shut-down of three years.

The Star Glass Company, Star City, W. Va., has increased its capital from $50,000 to $150,000 to provide additional working capital for installing modern labor saving machinery.

Rebuilding of the plant of the **Model Window Glass Company,** Fort Smith, Ark., which was destroyed by fire several months ago, has begun.

The Berkeley Glass Sand Company, Berkeley Springs, W. Va., have moved their Pittsburgh office to the Empire Building where H. M. Felker continues in charge.

At a sheriff's sale held on January 28 the property of the **Elk Run Window Glass Company,** Punxsutawney, Pa., was taken over by the Punxsutawney National Bank and the Farmers and Miners Trust Company to profect their loans.

Factory No. 1 of the **Harding Glass Company,** Ft. Smith, Ark., is changing from hand to machine methods by installing four-cylinder machines. Factory No. 2 will continue to operate as a hand plant during the spring period.

The Chamber of Commerce, Fort Smith, Ark., has announced that **Ball Bros. Company,** Muncie, Ind., has entered into an agreement to erect a branch factory in that city for the manufacture of fruit jars and other blown ware.

Turner E. Campe, assistant secretary, Chamber of Commerce, Brownwood, Texas, according to te *Manufacturers' Record,* wishes to correspond with manufacturers of glass plant equipment.

Warren H. Turner, formerly of the Hires-Turner Glass Co. and now vice-president and treasurer of the Standard Plate Glass Corporation, and his family have moved from Philadelphia to Sewickley, Pa., in the suburbs of Pittsburgh.

J. M. Nurre Glass Company, Bloomington, Ind., has been incorporated to make glass products, mirrors, etc.; capital $50,000. Incorporators: Joseph M. Nurre and W. Edward Showers, both of Bloomington.

According to the Mt. Vernon, O., *Republican,* a suit was filed by Tom Kline in January in the Licking County Common Pleas Court asking for the appointment of a receiver for the **Licking Window Glass Company,** of Utica, O.

Early in January a temporary receiver was appointed for the **Royal Window Glass Company,** Grafton, W. Va. The plant was equipped with Hilton machines. A suit started by the American Window Glass Company and alleging infringement of patents is said to be pending against the company.

Warren Gump has been appointed receiver for the **Universal Plate Glass Company,** Valley Park, Mo. This company was organized to take over the plant of the Missouri Plate Glass Company which failed in 1921, but operations were never resumed.

The Quezal Glass Manufacturing Company, Inc., Brooklyn, N. Y., has taken over the entire plant and business of the Quezal Art Glass and Decorating Company, and will continue the manufacture of the Quezal line of art glass and will add new lines of merit.

The Continental Flat Glass Company, Cedar Grove, La., of which Louis Mottet is president, began operations early in January, the plant having been equipped with Fourcault machines. The company is operating under the scale of the Window Glass Cutters' League of America.

The Passaic Glass Company, Passaic, N. J., has been incorporated with authorized capital stock of $100,000. The incorporators are: Leonard Troast and Charles Elias, 812 Main avenue, Passaic, N. J. Louis A. Cowley, of Passaic, is also said to be interested.

The Eldred Window Glass Company at Punxsutawney, Pa., has had negotiations under way for some time past which, if consummated, will provide for the installation of cylinder drawing machines for the manufacture of window glass. The plant at present has a 42-pot capacity.

A positive announcement is reported to have been made by Charles P. Snow, president of the Chamber of Commerce at Huntington, W. Va., to the effect that the **Charles Boldt Glass Company** will dismantle their Cincinnati factory and move most of the equipment to their Huntington plant, taking with them about 100 workers.

The corporation of Gillinder Brothers, glassware manufacturers, Port Jervis, N. Y., has been granted a New York State charter. The company is capitalized at $600,000 and the incorporators and officers are: William T. Gillinder, president; Edwin B. Gillinder, vice-president, and James Gillinder, secretary and treasurer.

Alexander Silverman, head of the Department of Chemistry, University of Pittsburgh, and well known as a specialist in glass, has been elected chairman of the Pittsburgh Section of the American Chemical Society. **E. W. Tillotson,** another well known glass man, and assistant director of the Mellon Institute of Industrial Research, was elected Councillor.

Pulaski Mirror Company, Pulaski, Va., has been incorporated to make glass products. Capital $50,000. Incorporators: H. C. Gilner and Beulah Dillon, both of Pulaski, to act as president and secretary, respectively. The company has the contract for a new factory building 80 by 175 feet, one story, of steel and concrete construction.

The plant of **Bakers Brothers** at Okmulgee, Okla., is being equipped with four machines for drawing window glass. The plant formerly had a capacity of 42 pots and it is claimed that with the installation of the machines the factory production will be increased about 40 per cent and summer shutdowns eliminated.

Max W. Atwood of the glass industry department of Laclede-Christy is back on the territory which he previously covered. He was away from Laclede-Christy the latter part of 1923 for the first time in his thirteen years of service with them. Mr. Atwood is well known to the glass trade in the central and southwestern districts.

The Columbia Glass Company, Fairmont, W. Va., established in 1907 to manufacture opal nest eggs, has been incorporated with a capital stock of $150,000 to manufacture a general line of opal containers and other glassware. The officers of the company are: President, Antonio Scalise; vice-president, Glenn F. Barns; secretary and treasurer, O. A. Wood.

George O. Smith, chemist and author of the article on the production of high grade colorless glass in tank furnaces, published in the January issue, and a member of the Baltimore Decolorizer Company, 3405 Clifton Ave., Baltimore, Md., has established a consulting service in connection with the company's activities, for the benefit of concerns desiring advice on glass-making problems.

Clayton A. Eddy, formerly manager of advertising and sales promotion of the American Blower Company, Detroit, Mich., has joined the Industrial Advertising Company of Detroit. This organization recently took over the handling of advertising for all of the divisions of the **Truscon Steel Company,** Youngstown, O. Included in these divisions are steel windows and standard steel buildings for glass factories and other manufacturing plants.

The Wheeling Glass Manufacturing Company, Wheeling, W. Va., capitalized at $100,000, will operate the plant of the former North Wheeling Glass Bottle Company. The company will discontinue making bottles and will manufacture a line of decorated ware, tableware and possibly milk bottles. Robert G. Pease, of the company, states that no extensive improvements or changes are contemplated. Manufacturing operations will probably begin early in February.

The Athens Glass Company, Morgantown, W. Va., has changed its firm name to **Dura Glass Manufacturing Company,** but no change has been made in the officers of the company who are as follows: President, J. M. Wood; vice-president, H. A. Kauffeld; secretary and treasurer, E. B. Stone; general manager, William D. Stone. New equipment will be installed and the company will manufacture tumblers, stemware and tableware, the sales of which will be handled under contract by a New York agency under the copyrighted name of "Dura."

The Southern Glass Company, 2501 East 26th street, Los Angeles, Cal., is erecting a second plant on its property at the above address consisting of a fireproof steel building 60 by 160 feet to be used for the manufacture of bottles, and a steel warehouse 80 by 150 feet. With the completion of this second unit, which will be entirely equipped for automatic operation, including continuous lehrs, feeders and other labor saving devices, the company will have two modernly equipped plants on the same property. The new plant will give the company two five-ring tanks with a capacity of 70 tons a day or about five carloads of bottles per day.

Coming Meetings

The Spring meeting of the American Society of Mechanical Engineers will be held at Cleveland, O., May 26 to 29.

The next annual meeting of the National Ornamental Glass Manufacturers' Association of the United States and Canada will be held at New York, June 24 to 26, 1924.

Society of Glass Technology, S. English, secretary, announces meetings for 1924 as follows: February 20, Sheffield; March 19, Stourbridge; April 16, Sheffield (annual general meeting); May 21, London and June 18, Sheffield. Details of programs will be announced a week prior to each meeting.

Recent Deaths

Myron L. Case

The death of Myron L. Case, president of the Crown Window Glass Co. at his home in Bowling Green, O., occurred late in December. During his lifetime Mr. Case had been deeply interested in various glass factories.

W. Scott Wheaton

W. Scott Wheaton, Millville, N. J., president of the Millville Bottle Works, died at his home on January 22, at the age of 60. Mr. Wheaton, when a young man, became associated with the T. C. Wheaton Company, but in 1903 left them and organized the Millville Bottle Works. He is survived by his widow, one daughter, one son and two brothers.

Inquiries Received

For further information address THE GLASS INDUSTRY

175. Can you give us the names of makers of crystal gazing balls? (Jan. 10.)

176. We are interested in getting in touch with a glass concern that is equipped to make quite a few thousand glass barrels shaped like our trademark with an electric light inside or behind to give the effect of rays emananting from the trademark. What we want to reproduce is a barrel in glass with lettering on it about 20 by 20 inches, on a stand of some kind. Globes similar to those used for Socony gasoline signs only shaped like a barrel will give an idea of what we have in mind. (Jan. 16.)

177. Kindly refer me to a concern which makes machinery for bending glass tubing. (Jan. 9.)

178. We are manufacturers of cut glassware and would like the names of firms that can furnish cutting machines and kilns. (Jan. 22.)

Stock Quotations

(Reported by Moore, Leonard & Lynch, Frick Building, Pittsburgh, Pa.)

PITTSBURGH STOCK EXCHANGE JANUARY 28, 1924

	Bid	Ask	Last
American Window Glass Machine Common	94	95	95
American Window Glass Machine Preferred	94	95	94
American Window Glass Preferred	111	114	110
Pittsburgh Plate Glass	218	225	219
U. S. Glass	..	24	23

Pittsburgh Plate Glass has been strong on the Pittsburgh Stock Exchange, showing good demand and an increase of several points even after going ex-dividend. American Window Glass has been steady, while U. S. Glass has been inactive, being offered at 24.

WHEELING STOCK EXCHANGE JANUARY 28, 1924

	Bid	Ask	Last
Hazel-Atlas	35	36	35½
Imperial Glass	..	90	90
Fostoria Glass	140	..	150
Central Glass	105	115	110

There has been a good demand for glass stocks on the Wheeling Exchange during the month, especially for Fostoria, which sold at 150. Earnings of Central Glass for the six month period were reported to be good and the asked price increased to 115.

TOLEDO STOCK EXCHANGE JANUARY 28, 1924

	Bid	Ask	Last
Owens Bottle Machine, common	45½	45¾	45½
Libbey-Owens Sheet Glass, common	96	99	97½
Libbey-Owens Sheet Glass, preferred	105	108	107

Current Prices of Glass-Making Materials

Quotations furnished by various producers, manufacturers and dealers

January 28, 1924

		Carlots	Less Carlots
Aluminum hydrate ($Al(OH)_3$)	lb.	.05	.05½
Aluminum oxide (Al_2O_3)	lb.	.06½	.07
Antimony oxide (Sb_2O_3)	lb.	.07½	.08½
Arsenic trioxide (As_2O_3) (dense white), 99%	lb.	.13	.13½
Barium carbonate ($BaCO_3$) (precipitated)	ton	70.00	85.00
Barium hydrate ($Ba(OH)_2$)	lb.	.05	.05½
Bone ash	lb.	.06½	.07
Borax ($Na_2B_4O_7 10H_2O$)	lb.	.05½	.06
Borax, fused ($Na_2B_4O_7$) any mesh	lb.	.19	.20
Boric acid (B_2O_3), fused	lb.	.35	.35
Cadmium Sulphide (CdS)—			
Red	lb.	..	1.60
Orange	lb.	..	1.65
Yellow	lb.	..	1.85
Chrome Oxide (Cr_2O_3)	lb.	.30-.35	.36
Cobalt Oxide (Co_2O_3)—			
In bbls.	lb.	..	2.10
In 10 lb. tins	lb.	..	2.20
Copper oxide—			
Red (Cu_2O)	lb.	..	.20
Black (CuO)	lb.	..	.25
Black prepared	lb.	..	.30
Cryolite (Na_3AlF_6)	lb.	..	.09⅛
Feldspar—			
100 mesh	ton	14.00-18.00	20.00
80 mesh	ton	15.00	18.00
40 mesh	ton	12.50	15.50
Ferrous oxide (FeO)	lb.	..	..
Fluorspar (CaF_2)—			
Powdered white, 95%	ton	40.00	50.00
Powdered white, 90%	ton	38.00	45.00
Hydrofluoric acid (HF) 60% (in lead carboys)	lb.	..	.13
Kaolin (f.o.b. mine)	ton	9.00	14.00
Lead Oxide (Pb_3O_4) (red lead)	lb.	.11¼	.11½
Litharge (PbO)	lb.	.11	.11¼
Lime—			
Hydrated ($Ca(OH)_2$) (in 50 lb. paper sacks)	ton	12.50	..
Burnt (CaO) ground, in bulk	ton	9.00	..
Burnt, ground, in paper sacks	ton	11.00	..
Burnt, ground, in 280 lb. bbls. per bbl.		2.15	2.30
Magnesium carbonate ($MgCO_3$)	lb.	..	.09
Manganese 85% (MnO_2)	lb.	.03¾	.04
Nickel oxide (Ni_2O_3), black, for nickel content	lb.	.32	.45
Nickel monoxide (NiO), green, for nickel content	lb.	.30	.50
Potassium carbonate—			
Calcined (K_2CO_3) 90%	lb.	.06¼	.06¾
Hydrated (KOH) 90%	lb.	.06¾	.07¼
Potassium nitrate (KNO_3) (gran.)	lb.	.06½	.06¾
Potassium Permanganate ($KMnO_4$)	lb.	..	.17
Powdered blue	lb.	..	.26
Standard formula	lb.	..	.32
Salt cake, glassmakers (Na_2SO_4), f.o.b. works	ton	21.00-26.00	30.00-40.00
Selenium (Se)	lb.	..	2.20-2.35
Soda ash (Na_2CO_3) dense, 58%— f. o. b. works.			
Bulk, spot	Flat 100 lb.	1.40	..
Bulk, on contract	Flat 100 lb.	1.35	spot 1.40
In 400 lb. bbls., on contract	100 lb.	1.69	spot 1.74
In 300 lb. bags, on contract	100 lb.	1.45	spot 1.50
Spot orders .05 per 100 lbs. higher.			
Sodium nitrate ($NaNO_3$), refined (Gran.)	lb.	.04¼	.04½
Sodium selenite (Na_2SeO_3)	lb.	..	2.00-2.50
Sodium Fluosilicate (Na_2SiF_6)	lb.	.07	.07¾
Sulphur (S)—			
Flowers, in bbls.	Per 100 lb.	3.35	3.65-3.90
Flowers, in bags	Per 100 lb.	3.00	3.30-3.55
Flour, heavy, in bbls.	Per 100 lb.	2.50	2.80-3.05
Uranium oxide (UO_3), 100 lb lots	lb.	..	2.00-2.50
Zinc oxide (ZnO)	lb.	.08	.08¼

Monthly Summary of United States Foreign Commerce in Glass

Exports

Corrected to December 21, 1923

	November 1922 Quantity	November 1922 Value	November 1923 Quantity	November 1923 Value	Eleven Months Ending November 1922 Quantity	Eleven Months Ending November 1922 Value	Eleven Months Ending November 1923 Quantity	Eleven Months Ending November 1923 Value
Glass and glass products (total)	.....	$704,174	.....	$943,026	.....	$7,771,210	.....	$10,126,812
Plate and window glass—								
Window glass, common, box 50 sq. ft	1,855	12,138	3,699	19,399	30,637	165,219	40,602	220,803
Plate glass, unsilvered, sq. ft	227,279	69,232	66,256	22,826	2,642,532	1,072,129	1,833,586	787,889
Other window and plate glass, n.e.s. lbs.	174,024	14,486	173,353	19,369	1,800,643	202,497	3,171,399	354,140
Glass containers (bottles, vials and jars) lbs.	3,451,714	195,970	5,807,751	292,325	37,927,352	2,073,669	68,522,958	3,267,455
Table glassware, plain lbs.	1,354,538	143,759	2,129,924	243,080	11,673,679	1,284,057	19,130,085	2,102,633
Table and other glassware, cut or engraved lbs.	51,561	20,897	44,696	15,433	419,245	158,057	515,470	196,307
Glass for lighting—								
Lamp chimneys and lantern globes lbs.	123,080	19,805	204,325	35,031	1,285,932	257,683	1,849,298	358,068
Globes and shades for lighting fixtures lbs.	194,460	41,065	215,470	49,210	1,421,185	395,251	1,498,297	436,036
Lamps and other illuminating devices, chiefly of glass lbs.	102,238	33,450	168,522	30,582	1,000,998	351,608	1,449,542	362,363
Chemical glassware lbs.	16,431	11,767	22,085	17,854	254,286	141,656	228,023	161,420
Electrical glassware, except for lighting lbs.	120,016	7,828	202,128	12,433	1,955,898	147,863	2,503,488	166,548
Other glassware, n.e.s. lbs.	965,809	133,777	980,155	185,484	11,740,487	1,521,521	9,604,529	1,713,150

Imports

Corrected to December 24, 1923

	November 1922 Quantity	November 1922 Value	November 1923 Quantity	November 1923 Value	Eleven Months Ending November 1922 Quantity	Eleven Months Ending November 1922 Value	Eleven Months Ending November 1923 Quantity	Eleven Months Ending November 1923 Value
Glass (total)	.....	$1,415,960	.....	$1,980,956	.....	$12,487,626	.....	$22,876,169
Cylinder, crown, and sheet, lbs. dut.	.....	.....	.....	.....	[1]41,597,241	[1]2,085,182	.....	.....
Unpolished, lbs. dut.	4,362,278	185,108	1,622,052	94,848	[2]7,903,967	[2]326,729	43,176,855	1,928,398
Bent, ground, beveled, colored, painted, etc. and polished dut.	.....	65,502	.....	60,141	.....	[2]137,786	.....	730,589
Plate glass—								
Unsilvered, sq. ft. dut.	1,351,247	654,942	1,981,186	1,253,086	9,304,518	4,323,794	24,292,128	14,728,050
Fluted, rolled, etc., or silvered, or containing wire netting, sq. ft. dut.	128,068	25,164	143,827	15,913	[2]376,269	[2]77,450	2,036,999	337,659
Containers—bottles, vials, etc. dut.	.....	24,748	.....	10,042	.....	277,568	.....	185,367
Table and kitchen utensils, lbs. dut.	119,670	44,056	79,285	25,246	[2]240,053	[2]95,476	601,644	158,394
Glassware, cut or decorated, lbs. dut.	236,709	121,584	287,734	163,687	.....	1,943,671	3,330,515	1,339,360
Blown glassware, n. e. s., lbs. dut.	402,903	112,526	470,759	176,735	[2]1,061,152	[2]275,373	5,948,577	1,360,828
Other glassware { free	.....	.....	.....	.....	[2]126,421	[2]106,800	.....	.....
Other glassware { dut.	.....	182,330	.....	181,258	.....	2,837,797	.....	2,107,524

[1] Jan. 1 to Sept. 21. [2] Beginning Sept. 22.